WHAT IS CLAIMED IS:

1. A low-stretch, flexible composite comprising:

a sheet of material; and

the sheet comprising at least one section having expected load lines extending over the section, each the section comprising:

a first layer of material; and

a plurality of discontinuous, stretch-resistant segments adhering to the first layer of material and extending generally along the expected load lines, a majority of the segments having lengths substantially shorter than corresponding lengths of the expected load lines within the section.

2. The composite according to claim 1 wherein sail section comprises a corner.

3. The composite according to claim 2 wherein a majority of the load lines extend from the corner.

4. The composite according to claim 1 wherein the number and placement of the segments generally correspond to the expected load lines so to help create a constant-strain composite under a chosen loading of the composite.

5. The composite according to claim 1 wherein the sheet has three corners.

6. The composite according to claim 1 wherein the sheet comprises a plurality of the sections.

7. The composite according to claim 1 wherein the sheet comprises only one said section.

8. The composite according to claim 1 wherein the sheet is a generally two-dimensional, flat sheet.

9. The composite according to claim 1 wherein the sheet is a three-dimensional sheet.

10. The composite according to claim 1 wherein the sheet comprises a second layer of material adhered to the first layer of material with the segments captured therebetween.

11. The composite according to claim 1 wherein the first layer of material is at least substantially imperforate.

12. The composite according to claim 1 wherein the segments are oriented to within about 6° of the expected load lines.

13. The composite according to claim 1 wherein the segments comprise fibers.

14. The composite according to claim 1 wherein said segments comprise yarns.

15. The composite according to claim 14 wherein said yarns comprise multiple fiber yarns.

16. The composite according to claim 15 wherein the multiple fiber yarns comprise untwisted fibers.

17. The composite according to claim 13 wherein the fibers comprise laterally dispersed fibers.

18. The composite according to claim 17 wherein the laterally dispersed fibers comprise generally single-layer fibers.

19. The composite according to claim 1 wherein the section comprises mats of stretch-resistant mat elements, at least most of the mat elements in each the mat being generally parallel.

20. The composite according to claim 19 wherein the mat elements are oriented at angles of from about 0° to 3° relative to one another.

21. The composite according to claim 19 wherein the mat elements are oriented at angles of from about 0° to 6° relative to one another.

22. The composite according to claim 19 wherein at least a majority of the mat elements cross other mat elements.

23. The composite according to claim 19 wherein said mat elements comprise laterally spaced-apart mat elements.

24. The composite according to claim 19 wherein said mat elements comprise a layer of laterally-arranged mat elements.

25. The composite according to claim 24 wherein the laterally-arranged mat elements comprise laterally-arranged mat fibers.

26. The composite according to claim 25 wherein the mat fibers of each mat are oriented relative to one another over a range of angles from about 0° to 6° so that at least a majority of the mat fibers cross other mat fibers.

27. The composite according to claim 19 wherein at least some of the mats comprise cross-elements extending transverse to the generally parallel mat elements.

28. The composite according to claim 27 wherein said mat elements comprise:

laterally spaced-apart mat elements; and

a layer of laterally-arranged mat elements.

29. The composite according to claim 28 wherein said laterally spaced-apart mat elements comprise multi-fiber yarns and the layer of laterally-arranged mat elements comprise a layer of laterally-arranged fibers which are generally parallel and in contact with adjacent fibers.

30. The composite according to claim 19 wherein the mat elements of at least one of the mats are of generally equal length.

31. The composite according to claim 30 wherein the mat elements of the at least one of the mats have ends which are generally aligned with one another.

32. The composite according to claim 19 wherein at least some of the mats overlap adjacent ones of the mats.

33. The composite according to claim 1 wherein the segments comprise segment ends, said segment ends being laterally-staggered.

34. The composite according to claim 1 wherein the sheet of material is in the form of a sail having a plurality of corners with expected load lines extending from the corners.

35. The composite according to claim 34 wherein the at least one section is a flat, two-dimensional section.

36. The composite according to claim 34 wherein the at least one section is a three-dimensional section.

37. The composite according to claim 1 wherein at least some of the segments are mounted to a flexible central strand to form a belt of segments extending generally perpendicular to said central strand.

38. A low-stretch, flexible composite comprising:

a sheet of material; and

the sheet comprising a section, the section comprising:

a first layer of material;

a plurality of discontinuous, stretch-resistant segments adhering to the first layer of material; and

said segments having segment ends, at least most of said segment ends being laterally-staggered.

39. The composite according to claim 38 further comprising:

a second layer of material adhered to the first layer of material with the segments captured therebetween; and wherein:

the segments comprise mats of stretch-resistant mat elements, at least most of the mat elements in each mat being generally parallel.

40. The composite according to claim 39 wherein:

the sheet comprises expected load lines extending over the section when the sheet is to be used as an air foil of a sailcraft sail under a chosen loading;

the mat elements extend generally along the expected load lines within the section; and

the mat elements comprise mat fibers, said mat fibers of each said mat element oriented over a range of angles from about 0° to 6° relative to the orientation of said mat element.

41. A method for making a composite, the composite expected to be placed under a load creating expected load lines, comprising:

choosing stretch-resistant segments;

selecting a first layer of material having a circumferential edge;

arranging the segments on the first layer of material generally along expected load lines;

the choosing step comprising the step of selecting lengths of the segments so that at least most of the segments extend only part way along the expected load lines; and

securing the segments to the first layer of material so to create a composite.

42. The method according to claim 41 wherein the choosing step comprises selecting yarns as the segments.

43. The method according to claim 41 wherein the arranging step is carried out so that the mat elements of each mat are oriented at a range of angles from about 0°to 6° relative to one another.

44. The method according to claim 41 wherein the choosing step is carried out with at least some of the segments secured to a control strand to form a belt of segments.

45. The method according to claim 44 wherein the arranging step comprises orienting the control strand generally perpendicular to the expected load lines.

46. The method according to claim 41 wherein the choosing step is carried out so that said segments comprise mats of mat elements as said segments, at least most of the mat elements in each the mat being generally parallel.

47. The method according to claim 46 wherein the choosing step is carried out so that the mat elements of each mat comprise mat fibers.

48. The method according to claim 47 wherein the choosing step is carried out so that the mat fibers for each mat are laterally-arranged mat fibers oriented over a range of angle from about 0° to 6°.

49. The method according to claim 46 wherein the choosing step comprises:

separating multi-fiber yarn into generally parallel, laterally-oriented fibers; and

adhering the fibers to one another to form a fiber sheet.

50. The method according to claim 49 wherein said choosing step comprises severing the fiber sheet to form the mats.

51. The method according to claim 49 wherein the separating step includes pneumatically spreading the fibers.

52. The method according to claim 51 wherein the choosing step comprises wrapping the pneumatically-spread fibers onto a rotating drum.

53. The method according to claim 52 wherein the adhering step comprises applying an adhesive onto said pneumatically-spread fibers on said drum.

54. The method according to claim 46 wherein the choosing step includes selecting mat segments in the form of multi-fiber yarns.

55. The method according to claim 54 wherein the choosing step is carried out with at least some untwisted-fiber yarns.

56. The method according to claim 54 wherein the choosing step is carried out so that at least most of the yarns of each the mat are laterally spaced-apart from one another.

57. The method according to claim 56 wherein the choosing step comprises adhering transversely oriented yarns to the laterally spaced-apart yarns to create stabilized mats.

58. The method according to claim 46 wherein the choosing step comprises selecting mat segments in the form of:

laterally spaced-apart multi-fiber yarns; and

a layer of laterally-arranged fibers, said fibers generally being in contact with adjacent fibers.

59. The method according to claim 46 further comprising:

determining the placement of the mats along the load lines; and wherein the mats arranging step comprises:

creating mat placement marks on a mat lay-up surface based upon the mat placement determining step; and

arranging the mats on the mat lay-up surface according to the mat placement marks.

60. The method according to claim 59 wherein the mat placement marks creating step comprises optically projecting the mat placement marks onto the mat lay-up surface.

61. The method according to claim 60 wherein the optically projecting step is carried out by projecting the mat placement marks onto a tubular surface.

62. The method according to claim 60 wherein the optically projecting step is carried out by projecting2 continuous expected load lines onto the mat lay-up surface.

63. The method according to claim 60 wherein the mat placement marks creating step comprises orienting the mat lay-up surface in a generally vertical orientation.

64. The method according to claim 59 wherein the mat placement marks creating step is carried out using the first layer as the mat lay-up surface.

65. The method according to claim 41 wherein the securing step comprises laminating the segments between the first layer of material and a second layer of material, the layers of material and segments therebetween constituting a material stack.

66. The method according to claim 65 wherein the laminating step comprises subjecting the material stack to heat and pressure.

67. The method according to claim 65 wherein the laminating step comprises:

capturing the material stack between inner surfaces of first and second pressure elements; and

squeezing the material stack between the pressure elements.

68. The method according to claim 67 wherein the laminating step further comprises applying heat to the material stack.

69. The method according to claim 68 wherein at least part of the heat applying step is carried out during at least part of the forcing step.

70. The method according to claim 67 wherein the forcing step comprises creating a differential fluid pressure between the inner and outer surfaces of the pressure elements.

71. The method according to claim 70 wherein the differential fluid pressure creating step is carried out by applying a partial vacuum between the pressure elements.

72. The method according to claim 67 wherein the laminating step comprises:

flowing a heated fluid over and in contact with at least 80% of the outer surfaces of the pressure elements.

73. The method according to claim 72 wherein the heated fluid flowing step is carried out using a chosen one of heated air and heated oil as the heated fluid.

74. The method according to claim 72 wherein the capturing step is carried out using an elastomeric pressure element as the first pressure element.

75. The method according to claim 67 wherein the capturing step is carried out using first and second flexible pressusre sheets as the first and second pressure elements.

76. The method according to claim 75 further comprising urging a form against the outer surface of the second pressure sheet.

77. The method according to claim 76 wherein the form urging step is carried out prior to the heated fluid flowing step.

78. The method according to claim 76 wherein the form urging step is carried out using a three-dimensional form imparting a three-dimensional shape to the second pressure sheet.

79. The method according to claim 71 wherein the laminating step comprises enclosing the pressure elements and the material stack therebetween within a substantially sealed enclosure and the heated fluid flowing step is carried out by the forced circulation of heated air within the enclosure.

80. The method according to claim 78 wherein the laminating step comprises cooling the material stack by opening the enclosure to an ambient environment after the heated fluid flowing step.

81. The method according to claim 79 wherein the cooling step comprises forcing ambient air through the enclosure and over the pressure elements.

82. The method according to claim 41 further comprising finishing the sheet of composite material to form a sailcraft sail.

83. The method according to claim 41 further comprising:

joining a plurality of the composites; and

finishing said joined composites to create a sailcraft sail.

84. The method according to claim 78 further comprising finishing the composite to form a three-dimensional sailcraft sail.

85. The method according to claim 78 further comprising joining a plurality of the composites, and

finishing said joined composites to form a three-dimensional sailcraft sail.

86. The method according to claim 41 wherein arranging step includes laterally staggering the segments thereby helping to reduce weak areas in the composite.

87. The method according to claim 46 wherein said arranging step comprises laterally staggering and overlapping said mats to help reduce weak areas in the composite.

88. The method according to claim 41 wherein the arranging step comprises applying the segments in a manner to create a generally constant strain composite material.

89. A method for making a composite, the composite expected to be placed under a load, comprising:

choosing stretch-resistant segments, said segments having ends;

selecting a first layer of material;

arranging the segments on the first layer of material, the arranging step comprising laterally staggering the ends of the segments to help reduce weak areas; and

securing the segments to the first layer of material so to create a composite.

90. A laminating assembly comprising:

an enclosure defining an enclosure interior;

a lamination subassembly housed within the enclosure interior comprising:

first and second pressure elements defining a sealable lamination interior for containing a stack of material to be laminated therebetween;

means for creating a pressure differential between the enclosure interior and the lamination interior so the lamination interior is at a lower pressure than the enclosure interior; and

a fluid circulator fluidly coupled to the enclosure interior which operates in a heating mode to cause a heating fluid to circulate within the enclosure interior, the heating fluid flowing past and in effective thermal contact with at least 80% of each of the pressure elements so the pressure elements can be heated by the circulated heating fluid.

91. The laminating assembly according to claim 90 wherein the enclosure comprises an enclosure bottom and a removable enclosure top.

92. The laminating assembly according to claim 91 wherein the first and second pressure elements are mounted to the enclosure top and bottom, respectively.

93. The laminating assembly according to claim 90 wherein at least one of the pressure elements comprises a flexible pressure sheet.

94. The laminating assembly according to claim 93 wherein the flexible pressure sheet comprises an elastomeric pressure sheet.

95. The laminating assembly according to claim 90 wherein the first pressure element comprises a rigid, open-ended cylinder and the second pressure element comprises a flexible sleeve.

96. The laminating assembly according to claim 95 wherein the flexible sleeve comprises an elastomeric sleeve.

97. The laminating assembly according to claim 90 further comprising a form having a perforated form surface engageable with the second pressure sheet so that the second flexible sheet conforms to the form surface during use while permitting heating fluid to contact at least 80% of the second pressure sheet.

98. The laminating assembly according to claim 97 wherein the form surface is a three-dimensional form surface.

99. The laminating assembly according to claim 90 further comprising an enclosure opening placeable in open and closed conditions, and an ambient air fan associated with the enclosure opening for blowing ambient air into the enclosure interior with the enclosure opening placed in the open condition.

100. The laminating assembly according to claim 90 wherein the fluid circulator is at least partially housed within the enclosure interior.

101. The laminating assembly according to claim 90 wherein the fluid circulator heats and circulates heated air in the heating mode.

102. The laminating assembly according to claim 90 wherein the fluid circulator is also operable in a cooling mode, during which a cooling fluid is circulated within the enclosure interior.

103. The laminating assembly according to claim 102 wherein the fluid circulator circulates cooling air during the cooling mode.

104. The laminating assembly according to claim 103 wherein the cooling air is ambient air.

105. A method for laminating a stack of material comprising the following steps:

placing a stack of material to be laminated between first and second pressure elements of a lamination subassembly, the pressure elements defining a lamination interior, the lamination subassembly being housed within an enclosure interior of an enclosure;

creating a pressure differential between the enclosure interior and the lamination interior so the lamination interior is at a lower pressure than the enclosure interior;

circulating a heating fluid within the enclosure interior and past and in effective thermal contact with at least 80% of each of the pressure elements so the pressure elements and the stack of material therebetween are heated by the circulated heating fluid for a period of time thereby laminating the stack of material to create a composite; and

cooling the composite.

106. The method according to claim 105 wherein the differential pressure creating step is carried out by creating a partial vacuum between the pressure elements.

107. The method according to claim 105 wherein the placing step is carried out using first and second flexible pressure sheets as the pressure elements.

108. The method according to claim 105 wherein the placing step comprises the step of wrapping the stack of material to be laminated onto a rigid, open-ended tubular member, the tubular member acting as the first pressure element, and encasing the wrapped stack of material in a flexible pressure sheet acting as the second pressure element.

109. The method according to claim 108 wherein the encasing step is carried out using an elastomeric sleeve as the flexible pressure sheet.

110. The method according to claim 107 further comprising positioning a perforated form against the outer surface of the second pressure sheet.

111. The method according to claim 110 wherein the form remains positioned against the outer surface of the second sheet during at least a portion of the heating fluid circulating step.

112. The method according to claim 110 wherein the form positioning step is carried out using a three-dimensional form imparting a three-dimensional shape to the second pressure sheet.

113. The method according to claim 112 wherein the form positioning step is carried out using a form shaped to create a three-dimensional section of a three-dimensional sailcraft sail.

114. The method according to claim 112 wherein the form positioning step is carried out using a form shaped to create a three-dimensional composite used to make a single-piece three-dimensional sailcraft sail.

115. The method according to claim 110 wherein the circulating step is carried out with the entire first pressure sheet in effective thermal contact with the heating fluid.

116. The method according to claim 105 wherein the cooling step comprises the step of cooling the laminated stack of material by opening the enclosure to an ambient environment after the heating fluid circulating step.

117. The method according to claim 105 wherein the cooling step comprises the step of forcing ambient air through the enclosure and past and in effective thermal contact with at least 80% of each of the pressure elements.

118. The method according to claim 107 wherein the placing step is carried out using an enclosure comprising an enclosure bottom and a removable enclosure top with the first and second pressure sheets being mounted to the enclosure top and bottom, respectively.

119. The method according to claim 118 wherein the placing step comprises the steps of supporting the stack of material on the inside surface of the second sheet and then mounting the enclosure top to the enclosure bottom thereby capturing the stack of material between the first and second sheets.

120. The method according to claim 105 further comprising the step of removing the composite from between the pressure elements at least part of the cooling step being carried out prior to the removing step.

121. The method according to claim 105 further comprising the step of selecting the stack of material so that the composite can be used to make a sailcraft sail.